WIND BRACING

Fairfax County VIRGINIA

The information contained in these guidelines is for quick reference to ensure detached single family dwellings and townhouses conform to Section R602.10 of the *International Residential Code.*

in this publication:

CHOOSING A DESIGN

There are numerous methods from which to choose to ensure a building is capable to resist lateral loads.

- **Braced wall panels,** R602.10.1 – R602.10.4.
- **Continuous sheathing,** R602.10.5.
- **APA Narrow Walls**.
- **Engineered Design,** meeting the wind load requirements of R301.2.1.
- **Proprietary systems,** i.e., Simpson Strong-Tie Strong Wall Shearwall, Hardy Panels.

BRACED WALL LINES

A braced wall line is the exterior wall of a building containing a series of braced wall panels. Braced wall panels may be considered part of a single braced wall line if they offset out of plane no more than 4' provided the total out of plane dimension is no more than 8'. See FIGURE 1 below.

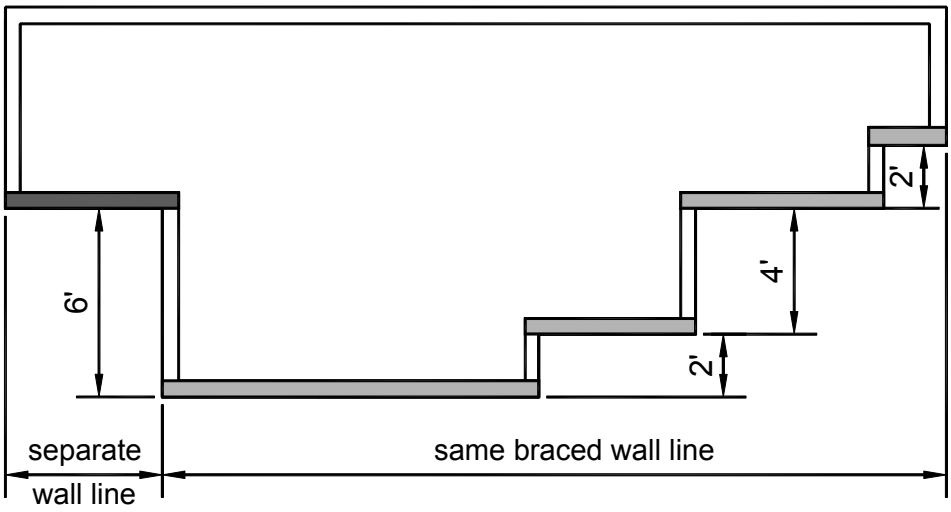


FIGURE 1: BRACED WALL LINES

BRACED WALL PANELS

Braced wall panels may be comprised of the methods shown in the table below, and each must be placed in the locations shown in the Table R602.10.3. See FIGURE 2.

Method	Material	Minimum Thickness	Panel Width
1	let-in bracing	1x4	per angle: 45° to 60°
2	diag. wood boards @ 24" o.c.	5/8"	48"
3	sheathing	5/16" for studs @ 16" o.c. 3/8" for studs @ 24" o.c.	48"
4	fiberboard	1/2" or 25/32" for studs @ 16" o.c. only	48"
5	gypsum board	1/2"	48" applied both sides 96" applied to one side
6	particle board	3/8" or 1/2" for studs @ 16" o.c. only	48"
7	Portland cement plaster	3 coats with corrosion resistant lath	48"
8	hardboard	7/16"	48"
Alternate braced panel	Panel widths above may be reduced to 32" using the panel construction below: • First floor only; maximum of two story building • 10' maximum height • 3/8" minimum wood structural panel (one side for one story, and both sides for first of two story) • Blocking at sheathing edges • Attach sheathing to framing with 8d nails @ 6" o.c. at edges and 12" o.c. at intermediate supports • Provide 2 anchor bolts at quarter points for one story and 3 anchor bolts at fifth points for first of two story • Provide tie-down device at panel ends with uplift capacity of 1,800 lbs for one story and 3,000 lbs for first of two story • #4 rebar in foundation within anchor bolt embedment length; foundation plan must reflect this requirement.		

TABLE R602.10.3

Condition	Type of Bracing	Amount of Bracing
One story Top of two or three story	Methods 1, 2, 3, 4, 5, 6, 7, or 8	Each end* and 25' o.c., not less than 16% of braced wall line
First story of two story Second story of three story	Methods 1, 2, 3, 4, 5, 6, 7, or 8	Each end* and 25' o.c., not less than 16% of braced wall line for Method 3 and 25% for Methods 2 - 8
First story of three story	Methods 2, 3, 4, 5, 6, 7, or 8	48" panels located at each end* and 25' o.c. , not less than 25% of braced wall line for Method 3 and 35% for Methods 2 – 8

*Panels may offset from ends no more than 12'-6"; however if both ends are offset by more than 12', a designed collector system must be employed.

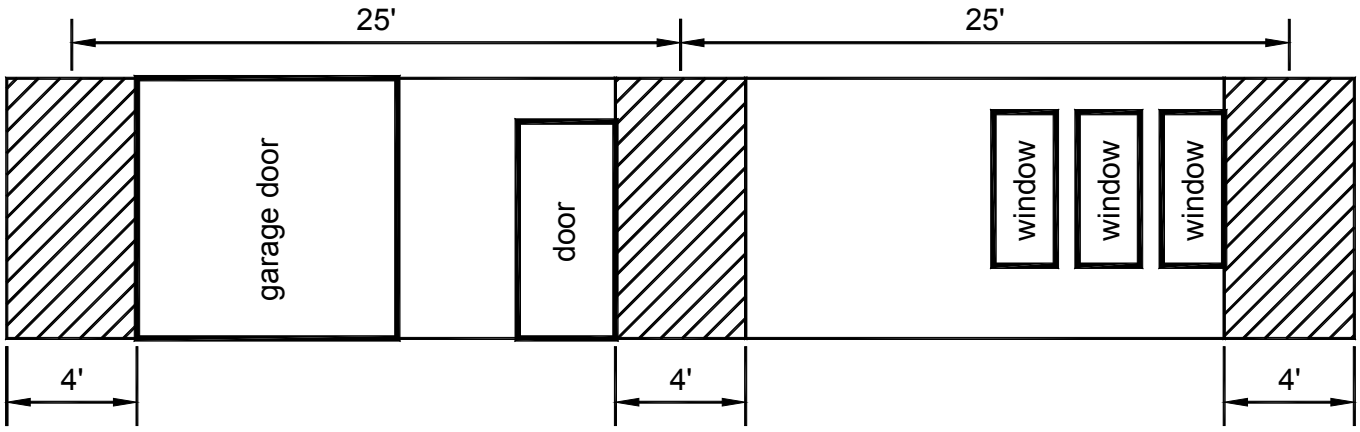


FIGURE 2: BRACED WALL PANEL LAYOUT
(each panel may be substituted with a 32" alternate braced panel)

CONTINUOUS SHEATHING

When continuously sheathing the entire structure and utilizing the material and thickness of Method 3, openings may be cut into 4' wide panels. Panels must continue to be 25' o.c., can also be offset 12'-6" maximum from corners, and can be substituted with a 32" alternate braced panel. Use Table R602.10.5 to determine minimum dimensions of panel widths; see also FIGURE 3.

TABLE R602.10.5*

Length of braced wall panel			Max. opening adjacent braced wall.
8' wall	9' wall	10' wall	
48"	54"	60"	100%
32"	36"	40"	85%
24"	27"	30"	65%

*Interpolation is permitted

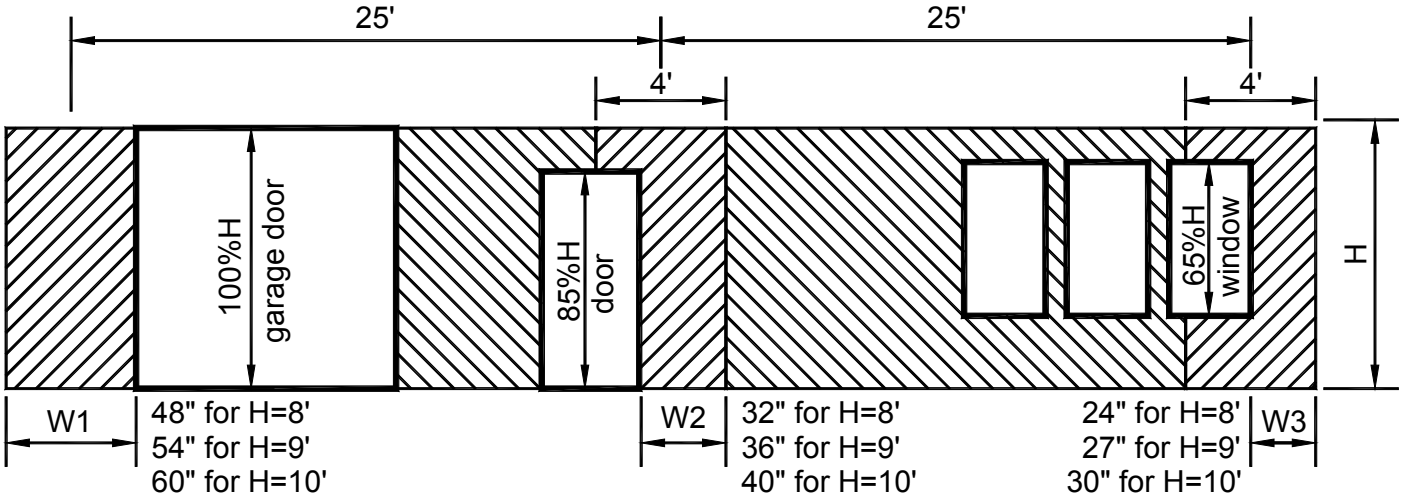
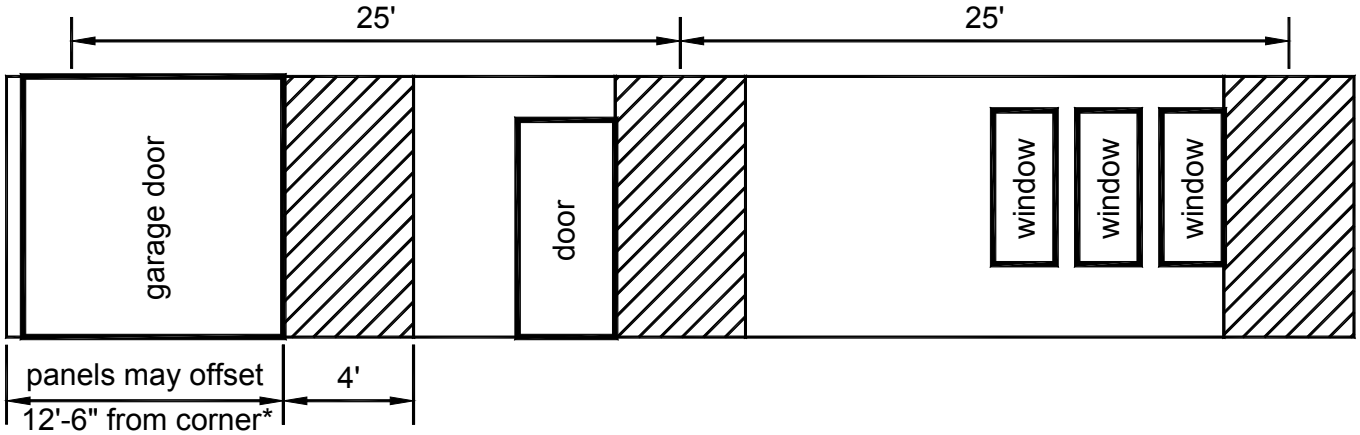


FIGURE 3: CONTINUOUS SHEATHING LAYOUT
(each panel may be substituted with a 32" alternate braced panel)

GARAGE DOOR OPTIONS

Options to accommodate garage doors are shown below. See also the APA method and proprietary systems.



*If panels at each end are offset more than 12', a designed collector system is required.

FIGURE 4: NARROW GARAGE DOOR AT CORNER
(braced wall shown; continuous sheathing also permitted.)

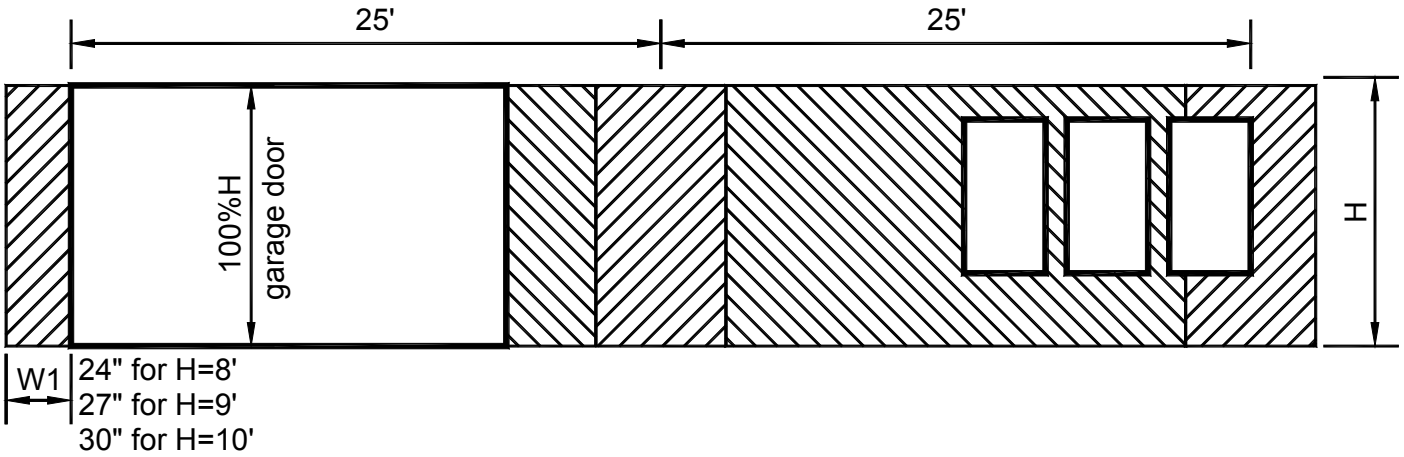


FIGURE 5: WIDE GARAGE DOOR NEAR CORNER
(continuous sheathing, one story only; see Table R602.10.3 for two and three story)

ENGINEERED DESIGN

When a building does not meet the criteria of R602.10, an engineered design is acceptable. Engineered calculations must analyze the structure utilizing the loads from R301.2.1. At minimum, the submitted calculations must show the following:

- Ensure both windward and leeward loads are applied to walls simultaneously.
- Specify sheathing thickness and nailing pattern for shear walls and diaphragms.
- Provide an adequate load path to the foundation.
- When utilizing an existing structure to resist lateral loads of an addition, provide an analysis of the existing lateral load resistance system with the new applied loads.
- Ensure post-to-beam connections are capable of resisting shear and rotation.